

What is claimed is:

1 1. A resynchronous control apparatus for a subscriber  
2 communication machine which communicates with an  
3 office communication machine over an existing  
4 communication line comprising:

5 an off-synchronous detector for detecting  
6 off-synchronization of communication with said office  
7 communication machine;

8 a correlation processor for correlatively  
9 processing received data received over said  
10 communication line and held data having been  
11 transmitted from said office communication machine  
12 when said off-synchronous detector detects said  
13 off-synchronization; and

14 a resynchronous controller for specifying a  
15 synchronous timing by said correlation process of said  
16 correlation processor to establish resynchronization  
17 in communication with said office communication  
18 machine.

1 2. The resynchrononous control apparatus for a  
2 subscriber communication machine according to claim  
3 1, wherein said correlation processor comprises:

4 a signal holder for holding signal data  
5 received from said office communication machine in  
6 steady communication; and

7           a correlation operator for operating  
8 correlation between held data held in said signal  
9 holder and received data received after detection of  
10 said off-synchronization to detect received data  
11 having high correlation with said held data.

1   3. The resynchronous control apparatus for a  
2 subscriber communication machine according to claim  
3 2, wherein said signal holder holds an average value  
4 of received data in a particular time section in said  
5 steady communication as said held data.

1   4. The resynchronous control apparatus for a  
2 subscriber communication machine according to claim  
3 2, wherein said correlation processor comprises:

4           a signal data maximum value holder for holding  
5 a maximum value of absolute values of said held data  
6 or a value obtained by adding an arbitrary margin value  
7 to said maximum value; and

8           a maximum value determination type correlation  
9 operation controller for making said correlation  
10 operator carry out said correlation operation in only  
11 a time section in which absolute values of received  
12 data received after said off-synchronization is  
13 detected are not larger than a value held in said signal  
14 data maximum value holder.

1 5. The resynchronous control apparatus for a  
2 subscriber communication machine according to claim  
3 2, wherein said correlation processor comprises:

4 a signal data minimum value holder for holding  
5 a minimum value, as a first value, of absolute values  
6 of said held data or a second value obtained by  
7 multiplying a value, which is obtained by adding an  
8 arbitrary margin value to said minimum value, by an  
9 arbitrary coefficient, and a result of comparison  
10 between the first or second value and the absolute value  
11 of said held data; and

12 a minimum value determination type correlation  
13 operation controller for making said correlation  
14 operator carry out said correlation operation in only  
15 a time section in which absolute values of received  
16 data of whole one symbol received after said  
17 off-synchronization is detected are larger than said  
18 minimum value or a value obtained by multiplying a value,  
19 which is obtained by adding an arbitrary margin value  
20 to said minimum value, by an arbitrary coefficient not  
21 larger than said coefficient at samples in which the  
22 absolute values of said held data are determined to  
23 be larger as results of said comparison.

1 6. The resynchronous control apparatus for a  
2 subscriber communication machine according to claim  
3 2, wherein said correlation processor comprises:

4           a frame boundary detector for detecting a frame  
5 boundary of said signal data on the basis of correlation  
6 between signal data of a length of a cyclic prefix  
7 attached to the head of received data received after  
8 off-synchronization is detected and signal data of a  
9 length of the cyclic prefix attached to the tail of  
10 the same; and

11           a frame boundary detection type correlation  
12 operation controller for making said correlation  
13 operator carry out said correlation operation on a  
14 frame specified by a frame boundary detected by said  
15 frame boundary detector.

1   7. The resynchronous control apparatus for a subscriber  
2 communication machine according to claim 3, wherein  
3 said correlation processor comprises:

4           a signal data maximum value holder for holding  
5 a maximum value of absolute values of said held data  
6 or a value obtained by adding an arbitrary margin value  
7 to said maximum value; and

8           a maximum value determination type correlation  
9 operation controller for making said correlation  
10 operator carry out said correlation operation in only  
11 a time section in which absolute values of received  
12 data received after said off-synchronization is  
13 detected are not larger than a value held in said signal  
14 data maximum value holder.

1 8. The resynchronous control apparatus for a subscriber  
2 communication machine according to claim 3, wherein  
3 said correlation processor comprises:

4 a signal data minimum value holder for holding  
5 a minimum value, as a first value, of absolute values  
6 of said held data or a second value obtained by  
7 multiplying a value, which is obtained by adding an  
8 arbitrary margin value to said minimum value, by an  
9 arbitrary coefficient, and a result of comparison  
10 between the first or second value and the absolute value  
11 of said held data; and

12 a minimum value determination type correlation  
13 operation controller for making said correlation  
14 operator carry out said correlation operation in only  
15 a time section in which absolute values of received  
16 data of whole one symbol received after said  
17 off-synchronization is detected are larger than said  
18 minimum value or a value obtained by multiplying a value,  
19 which is obtained by adding an arbitrary margin value  
20 to said minimum value, by an arbitrary coefficient not  
21 larger than said coefficient at samples in which the  
22 absolute values of said held data are determined to  
23 be larger as results of said comparison.

1 9. The resynchronous control apparatus for a subscriber  
2 communication machine according to claim 3, wherein

3 said correlation processor comprises:  
 4 a frame boundary detector for detecting a frame  
 5 boundary of said signal data on the basis of correlation  
 6 between signal data of a length of a cyclic prefix  
 7 attached to the head of received data received after  
 8 off-synchronization is detected and signal data of a  
 9 length of the cyclic prefix attached to the tail of  
 10 the same; and  
 11 a frame boundary detection type correlation  
 12 operation controller for making said correlation  
 13 operator carry out said correlation operation on a  
 14 frame specified by a frame boundary detected by said  
 15 frame boundary detector.

1 10. The resynchronous control apparatus for a  
 2 subscriber communication machine according to claim  
 3 1, wherein said subscriber communication machine  
 4 comprises an equalizer for adaptively equalizing  
 5 received data from said office communication machine  
 6 while updating a predetermined equalization  
 7 coefficient; and

8 said resynchronous controller makes said  
 9 equalizer not update said equalization coefficient  
 10 until said resynchronization is established after said  
 11 off-synchronization is detected.

1 11. The resynrhonous control apparatus for a

2 subscriber communication machine according to claim  
3 1, wherein said subscriber communication machine  
4 comprises a gain amplifier for adaptively amplifying  
5 a gain of received data from said office communication  
6 machine while updating a predetermined gain  
7 coefficient; and

8           said resynchronous controller makes said gain  
9 amplifier not update said gain coefficient until said  
10 resynchronization is established after said  
11 off-synchronization is detected.

1 12. The resynchronous control apparatus for a  
2 subscriber communication machine according to claim  
3 1, wherein said resynchronous controller stops  
4 transmission to said office communication machine  
5 until said resynchronization is established when said  
6 off-synchronization is detected by said  
7 off-synchronization detector.

1 13. A resynchronizing method for a subscriber  
2 communication machine which communicates with an  
3 office communication machine over an existing  
4 communication line comprising the steps of:

5           an off-synchronization detecting step of  
6 detecting off-synchronization with said office  
7 communication machine;

8           a correlation processing step of correlatively

9 processing received data received over said  
10 communication line and held data having been  
11 transmitted from said office communication machine  
12 when said off-synchronization is detected at said  
13 off-synchronization detecting step; and

14 a resynchronization controlling step of  
15 specifying a synchronous timing by said correlation  
16 process at said correlation processing step to  
17 establish resynchronization of the communication with  
18 said office communication machine.

1 14. The resynchronizing method for a subscriber  
2 communication machine according to claim 13, wherein  
3 said correlation processing step comprises the steps  
4 of:

5 a signal holding step of holding signal data  
6 received from said office communication machine in  
7 steady communication; and

8 a correlation operating step of operating  
9 correlation between said held data and received data  
10 received after said off-synchronization is detected  
11 to detect received data having high correlation with  
12 said held data.

1 15. The resynchronizing method for a subscriber  
2 machine according to claim 14, wherein at said  
3 correlation operating step, said correlation



4 operation is carried out in only a time section in which  
5 absolute values of received data received from said  
6 office communication machine are not larger than a  
7 maximum value of absolute values of said held data or  
8 a value obtained by adding an arbitrary margin value  
9 to said maximum value.

1 16. The resynchronizing method for a subscriber  
2 communication machine according to claim 14, wherein  
3 at said correlation operating step, a minimum value  
4 of absolute values of said held data or a value obtained  
5 by multiplying a value, which is obtained by adding  
6 an arbitrary margin value to said minimum value, by  
7 an arbitrary coefficient is compared with a magnitude  
8 of an absolute value of said held data, and said  
9 correlation operation is carried out in only a time  
10 section in which absolute values of received data of  
11 whole one symbol received after said  
12 off-synchronization is detected are larger than said  
13 minimum value or a value obtained by multiplying a value,  
14 which is obtained by adding an arbitrary margin value  
15 to said minimum value, by an arbitrary coefficient not  
16 larger than said coefficient at samples in which the  
17 absolute values of said held data are determined to  
18 be larger as results of said comparison.

1 17. The resynchronizing method for a subscriber

2 communication machine according to claim 14, wherein  
3 said correlation processing step comprises a frame  
4 boundary detecting step of detecting a frame boundary  
5 of received data received from said office  
6 communication machine on the basis of correlation  
7 between signal data of a length of a cyclic prefix at  
8 the head of received data received from said office  
9 communication machine after said off-synchronization  
10 is detected and a signal data of a length of the cyclic  
11 prefix at the tail of the same; and

12 at said correlation operating step, said  
13 correlation operation is carried out on a frame  
14 specified by the frame boundary detected at said frame  
15 boundary detecting step.